Chemical Analysis Report

SE-DIST-2016-07-27-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

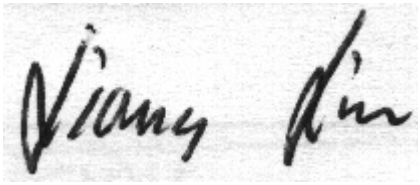
Event Description: **SMP-Ft. Drum Creek**
Request ID: **RQ-2016-07-04-38**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 18-AUG-2016 10:47



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Ft. Drum Creek @ 304th St. **Collection Date/Time: 07/26/2016 11:40**

Field ID: G3SE0012 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1819341	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P308762	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P309265	
		Sulfate	3.7		mg SO4/L	P309268	
	SM 2120 B	Color (true)	130	A	PCU	P308737	
	SM 2320 B-97	Total Alkalinity	39		mg CaCO3/L	P308918	
	SM 2540 C-97	TDS	121		mg/L	P309412	
	SM 2540 D-97	TSS	2	I	mg/L	P309009	
	SM 4500 F-C-97	Fluoride	0.077	I	mg F/L	P308921	
1819343	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P308938	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P309066	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P309030	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P309179	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P309047	
1819345	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P308732	
1819349	EPA 200.7 Rev. 4.4	Calcium	16.0		mg/L	P308969	
		Iron	670		ug/L	P308969	
		Magnesium	2.87		mg/L	P308969	
		Potassium	2.8		mg/L	P308969	
		Sodium	10.2		mg/L	P308969	
		Zinc	5.0	U	ug/L	P308969	
	EPA 200.8 Rev. 5.4	Arsenic	0.41		ug/L	P308969	
		Cadmium	0.020	U	ug/L	P308969	
		Chromium	0.88		ug/L	P308969	
		Copper	0.44		ug/L	P308969	
		Lead	0.15	I	ug/L	P308969	
		Nickel	0.37		ug/L	P308969	
		Silver	0.0050	U	ug/L	P308969	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 353.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Ft. Drum Creek @ 441 (South) **Collection Date/Time: 07/26/2016 11:50**

Field ID: G3SE0013 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1819342	EPA 180.1 Rev. 2.0	Turbidity	3.3		NTU	P308762	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P309265	
		Sulfate	4.9		mg SO4/L	P309268	
	SM 2120 B	Color (true)	110		PCU	P308737	
	SM 2320 B-97	Total Alkalinity	37		mg CaCO3/L	P308918	
	SM 2540 C-97	TDS	118		mg/L	P309412	
	SM 2540 D-97	TSS	5	I	mg/L	P309009	
	SM 4500 F-C-97	Fluoride	0.068	I	mg F/L	P308921	
1819344	EPA 350.1 Rev. 2.0	Ammonia-N	0.10		mg N/L	P308938	

Field ID: G3SE0013 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1819344	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P309066	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.17		mg N/L	P309030	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P309179	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P309047	
1819346	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P308732	
1819350	EPA 200.7 Rev. 4.4	Calcium	14.8		mg/L	P308969	
		Iron	860		ug/L	P308969	
		Magnesium	3.07		mg/L	P308969	
		Potassium	3.9		mg/L	P308969	
		Sodium	10.9		mg/L	P308969	
		Zinc	5.0	U	ug/L	P308969	
	EPA 200.8 Rev. 5.4	Arsenic	0.42		ug/L	P308969	
		Cadmium	0.020	U	ug/L	P308969	
		Chromium	1.01		ug/L	P308969	
		Copper	0.38	I	ug/L	P308969	
		Lead	0.16	I	ug/L	P308969	
		Nickel	0.25		ug/L	P308969	
		Silver	0.0050	U	ug/L	P308969	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 353.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P308762

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308969

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308969

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308969

Component	Result	Code	Units
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309265

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309268

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308938

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309066

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309030

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309179

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P308732

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B
Batch ID: P308737

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P308918

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 C-97
Batch ID: P309412

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P309009

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P308921

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P309047

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	95.8		P	85 - 115
Cadmium	98.3		P	85 - 115
Chromium	101		P	85 - 115
Copper	92.6		P	85 - 115
Lead	94.9		P	85 - 115
Nickel	93.0		P	85 - 115
Silver	94.9		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309265

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308938

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	104		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309066

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	102		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309030

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309179

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P308732

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P308918

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P308921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P309047

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	104		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819297	Calcium	104		P	80 - 120
1819297	Iron	105		P	80 - 120
1819297	Magnesium	104		P	80 - 120
1819297	Potassium	102		P	80 - 120
1819297	Sodium	102		P	80 - 120
1819297	Zinc	97.2		P	80 - 120
1820259	Calcium	107	110	P/P	80 - 120
1820259	Iron	107	108	P/P	80 - 120
1820259	Magnesium	109	111	P/P	80 - 120
1820259	Potassium	109	110	P/P	80 - 120
1820259	Sodium	105	107	P/P	80 - 120
1820259	Zinc	100	106	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819297	Arsenic	96.2		P	80 - 120
1819297	Cadmium	98.2		P	80 - 120
1819297	Chromium	100		P	80 - 120
1819297	Copper	88.7		P	80 - 120
1819297	Lead	96.3		P	80 - 120
1819297	Nickel	90.4		P	80 - 120
1819297	Silver	95.9		P	80 - 120
1820259	Arsenic	95.6	97.7	P/P	80 - 120
1820259	Cadmium	102	101	P/P	80 - 120
1820259	Chromium	105	104	P/P	80 - 120
1820259	Copper	92.9	94.2	P/P	80 - 120
1820259	Lead	98.2	98.0	P/P	80 - 120
1820259	Nickel	92.6	94.7	P/P	80 - 120
1820259	Silver	97.6	97.2	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309265

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819342	Chloride	99.3		P	90 - 110
1819387	Chloride	99.3		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819342	Sulfate	99.0		P	90 - 110
1819387	Sulfate	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819273	Ammonia-N	101	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309066

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819290	Kjeldahl Nitrogen	109	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309179

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819290	Total-P	99.2	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P308732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819127	O-Phosphate-P	98.5	99.3	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P309047

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1819343	Organic Carbon	95.6	97.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P308762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819311	Turbidity	0.680	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1820259	Calcium	1.98	Spike	P	0 - 20
1820259	Iron	1.38	Spike	P	0 - 20
1820259	Magnesium	1.74	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P308969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1820259	Potassium	1.58	Spike	P	0 - 20
1820259	Sodium	1.32	Spike	P	0 - 20
1820259	Zinc	5.22	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P308969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1820259	Arsenic	2.23	Spike	P	0 - 20
1820259	Cadmium	1.73	Spike	P	0 - 20
1820259	Chromium	0.582	Spike	P	0 - 20
1820259	Copper	1.32	Spike	P	0 - 20
1820259	Lead	0.287	Spike	P	0 - 20
1820259	Nickel	2.21	Spike	P	0 - 20
1820259	Silver	0.438	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309265

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819387	Chloride	0.0189	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819387	Sulfate	1.63	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P308938

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819273	Ammonia-N	0.850	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309066

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819290	Kjeldahl Nitrogen	0.800	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819289	NO2NO3-N	0.154	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309179

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819290	Total-P	1.38	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P308732

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819127	O-Phosphate-P	0.578	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P308737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819341	Color (true)	0.348	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P308918

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819279	Total Alkalinity	0.107	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P309412

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819215	TDS	8.24	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P308921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819279	Fluoride	0.470	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P309047

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1819343	Organic Carbon	1.21	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A70793
Included Lab Sample IDs: 1819345, 1819346

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	99.7	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A70794
Included Lab Sample IDs: 1819341, 1819342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	99.9	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A70799
Included Lab Sample IDs: 1819341, 1819342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Reference Method: SM 2320 B-97
Run ID: A70856
Included Lab Sample IDs: 1819341, 1819342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.9	104	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A70856
Included Lab Sample IDs: 1819341, 1819342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A70861
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	100	P/P	90 - 110
Ammonia-N	99.1	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A70885
Included Lab Sample IDs: 1819341, 1819342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	102	P/P	90 - 110
Sulfate	97.2	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A70894
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A70894
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A70902
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.1	98.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A70934
Included Lab Sample IDs: 1819349, 1819350

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	103	P/P	90 - 110
Iron	102	102	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Zinc	99.5	98.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A70940
Included Lab Sample IDs: 1819349, 1819350

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	97.1	97.5	P/P	90 - 110
Chromium	99.2	99.9	P/P	90 - 110
Lead	94.0	93.2	P/P	90 - 110
Silver	93.7	93.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A70963
Included Lab Sample IDs: 1819349, 1819350

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.2	94.7	P/P	90 - 110
Copper	94.4	91.5	P/P	90 - 110
Nickel	94.3	92.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A70977
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	98.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71036
Included Lab Sample IDs: 1819343, 1819344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.1	93.9	P/P	90 - 110
Kjeldahl Nitrogen	99.0	93.1	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.680	
EPA 200.7 Rev. 4.4	Calcium	106	104	107	110			1.98
	Iron	105	105	107	108			1.38
	Magnesium	107	104	109	111			1.74
	Potassium	103	102	109	110			1.58
	Sodium	104	102	105	107			1.32
	Zinc	100	97.2	100	106			5.22
EPA 200.8 Rev. 5.4	Arsenic	95.8	96.2	95.6	97.7			2.23
	Cadmium	98.3	98.2	102	101			1.73
	Chromium	101	100	105	104			0.582
	Copper	92.6	88.7	92.9	94.2			1.32
	Lead	94.9	96.3	98.2	98.0			0.287
	Nickel	93.0	90.4	92.6	94.7			2.21
	Silver	94.9	95.9	97.6	97.2			0.438
EPA 300.0 Rev. 2.1	Chloride	101	99.3	99.3			0.0189	
	Sulfate	97.1	97.6	99.0			1.63	
EPA 350.1 Rev. 2.0	Ammonia-N	104	101	100				0.850
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	109	108				0.800
EPA 353.2 Rev. 2.0	NO2NO3-N	104						0.154
EPA 365.1 Rev. 2.0	Total-P	101	99.2	97.8				1.38
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.5	99.3				0.578
SM 2120 B	Color (true)						0.348	
SM 2320 B-97	Total Alkalinity	103					0.107	
SM 2540 C-97	TDS						8.24	
SM 4500 F-C-97	Fluoride	100						0.470
SM 5310 B-00	Organic Carbon	104	95.6	97.8				1.21

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1819341, 1819342
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1819349, 1819350
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1819349, 1819350
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1819341, 1819342

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1819341, 1819342
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1819343, 1819344
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1819343, 1819344
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1819343, 1819344
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1819343, 1819344
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1819345, 1819346
SM 2120 B / E31780	True Color measured at 450 nm	1819341, 1819342
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1819341, 1819342
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1819341, 1819342
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1819341, 1819342
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1819341, 1819342
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1819343, 1819344

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	07/27/2016			07/27/2016 16:42	Sima Feizi	1819341, 1819342
EPA 200.7 Rev. 4.4	07/27/2016	08/01/2016	Elliott D. Healy	08/03/2016	Joshua Ayres	1819349, 1819350
EPA 200.8 Rev. 5.4	07/27/2016	08/01/2016	Elliott D. Healy	08/04/2016	Charles J. Peterson	1819349, 1819350
EPA 300.0 Rev. 2.1	07/27/2016			08/05/2016	Ping Hua	1819341, 1819342
EPA 350.1 Rev. 2.0	07/27/2016			07/29/2016	Julie Michelle Frank	1819343, 1819344
EPA 351.2 Rev. 2.0	07/27/2016	08/03/2016	Sofia Elnemr	08/04/2016	Christopher Armour	1819343, 1819344
EPA 353.2 Rev. 2.0	07/27/2016			08/02/2016	Peter D. Kaus	1819343, 1819344
EPA 365.1 Rev. 2.0	07/27/2016	08/04/2016	Vijayalakshmi Reddy	08/04/2016	Lipi Saha	1819343, 1819344
EPA 365.1 Rev. 2.0 dissolved	07/27/2016			07/27/2016 15:49	Julia Storbeck	1819345
	07/27/2016			07/27/2016 15:50	Julia Storbeck	1819346
SM 2120 B	07/27/2016			07/27/2016 17:57	Rochelle Y Jackson	1819341, 1819342
SM 2320 B-97	07/27/2016			07/30/2016	Dale L. Simmons	1819341, 1819342
SM 2540 C-97	07/27/2016			07/29/2016	Yijie Li	1819341, 1819342
SM 2540 D-97	07/27/2016			07/29/2016	Yijie Li	1819341, 1819342
SM 4500 F-C-97	07/27/2016			07/30/2016	Dale L. Simmons	1819341, 1819342
SM 5310 B-00	07/27/2016			08/02/2016	Sofia Elnemr	1819343, 1819344